vce trainer



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Microsoft Azure Architect Design

Score: 800/1000

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Version:

Time Limit: 120 Minutes

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Determine Workload Requirements

(5 questions)

Question 1

You plan to deploy 200 Microsoft SQL Server databases to Azure by using Azure SQL Database and Azure SQL Database Managed Instance.

You need to recommend a monitoring solution that provides a consistent monitoring approach for all deployments. The solution must meet the following requirements:

Support current-state analysis based on metrics collected near real-time, multiple times per minute, and maintained for up to one hour
Support longer term analysis based on metrics collected multiple times per hour and maintained for up to two weeks.
Support monitoring of the number of concurrent logins and concurrent sessions.

What should you include in the recommendation?

- ☐ dynamic management views
- ☐ trace flags
- ☐ Azure Monitor
- ☐ SQL Server Profiler

Question 2

You need to recommend a solution to generate a monthly report of all the new Azure Resource Manager resource deployments in your subscription.

What should you include in the recommendation?

- ☐ Azure Analysis Services
- ☐ Azure Activity Log
- ☐ Azure Monitor action groups
- ☐ Azure Advisor
- ☐ Azure Monitor metrics
- ☐ Azure Log Analytics
- ☐ Application Insights

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Question 3

You have an on-premises Hyper-V cluster. The cluster contains Hyper-V hosts that run Windows Server 2016 Datacenter. The hosts are licensed under a Microsoft Enterprise Agreement that has Software Assurance.

The Hyper-V cluster hosts 3 virtual machines that run Windows Server 2012 R2. Each virtual machine runs a different workload. The workloads have predictable consumption patterns.

You plan to replace the virtual machines with Azure virtual machines that run Windows Server 2016. The virtual machines will be sized according to the consumption pattern of each workload.

You need to recommend a solution to minimize the compute costs of the Azure virtual machines.

Which two recommendations should you include in the solution? Each correct answer presents part of the solution.

NOTE: Each correct selection is worth one point.

- ☐ Purchase Azure Reserved Virtual Machine Instances for the Azure virtual machines
- ☐ Create a virtual machine scale set that uses autoscaling
- ☐ Configure a spending limit in the Azure account center
- ☐ Create a lab in Azure DevTest Labs and place the Azure virtual machines in the lab
- ☐ Activate Azure Hybrid Benefit for the Azure virtual machines

Question 4

You have an on-premises Active Directory forest and an Azure Active Directory (Azure AD) tenant. All Azure AD users are assigned a Premium P1 license.

You deploy Azure AD Connect.

Which two features are available in this environment that can reduce operational overhead for your company's help desk? Each correct answer presents a complete solution.

NOTE: Each correct selection is worth one point.

- ☐ Azure AD Privileged Identity Management policies
- ☐ access reviews
- ☐ self-service password reset
- ☐ Microsoft Cloud App Security Conditional Access App Control
- ☐ password writeback

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Question 5

You are planning the implementation of an order processing web service that will contain microservices hosted in an Azure Service Fabric cluster.

You need to recommend a solution to provide developers with the ability to proactively identify and fix performance issues. The developers must be able to simulate user connections to the order processing web service from the Internet, as well as simulate user transactions. The developers must be notified if the goals for the transaction response times are not met.

What should you include in the recommendation?

- ☐ container health
- ☐ Azure Network Watcher
- ☐ Application Insights
- ☐ Service Fabric Analytics

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Design for Identity and Security

(29 questions)

Question 6

A company deploys Azure Active Directory (Azure AD) Connect to synchronize identity information from their on-premises Active Directory Domain Services (AD DS) directory to their Azure AD tenant. The identity information that is synchronized includes user accounts , credential hashes for authentication (password sync), and group membership. The company plans to deploy several Windows and Linux virtual machines (VMs) to support their applications.

The VMs have the following requirements:

Support domain join, LDAP read, LDAP bind, NTLM and Kerberos authentication, and Group Policy. Allow users to sign in to the domain using their corporate credentials and connect remotely to the VM by using Remote Desktop.

You need to support the VM deployment.

Which service should you use?

- ☐ Azure AD Domain Services
- ☐ Azure AD Privileged Identity Management
- ☐ Azure AD Managed Service Identity
- ☐ Active Directory Federation Services (AD FS)

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Question 7

You have an Azure subscription that contains a custom application named Application1. Application1 was developed by an external company named Fabrikam, Ltd. Developers at Fabrikam were assigned role-based access control (RBAC) permissions to the Application1 components. All users are licensed for the Microsoft 365 E5 plan.

You need to recommend a solution to verify whether the Fabrikam developers still require permissions to Application1. The solution must meet the following requirements:

To the manager of the developers, send a monthly email message that lists the access permissions to Application1.
If the manager does not verify an access permission, automatically revoke that permission.
Minimize development effort.

What should you recommend?

- ☐ In Azure Active Directory (AD) Privileged Identity Management, create a custom role assignment for the Application1 resources
- ☐ Create an Azure Automation runbook that runs the Get-AzureADUserAppRoleAssignment cmdlet
- ☐ Create an Azure Automation runbook that runs the Get-AzureRmRoleAssignment cmdlet
- ☐ In Azure Active Directory (Azure AD), create an access review of Application1

Question 8

You have an Azure subscription.

You need to recommend a solution to provide developers with the ability to provision Azure virtual machines. The solution must meet the following requirements:

Only allow the creation of the virtual machines in specific regions.
Only allow the creation of specific sizes of virtual machines.

What should include in the recommendation?

- ☐ conditional access policies
- ☐ Azure Policy
- ☐ Azure Resource Manager templates
- ☐ role-based access control (RBAC)

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Question 9

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You have an Azure Active Directory (Azure AZD) tenant named contoso.com. The tenant contains a group named Group1. Group1 contains all the administrative user accounts.

You discover several login attempts to the Azure portal from countries where administrative users do NOT work.

You need to ensure that all login attempts to the Azure portal from those countries require Azure Multi-Factor Authentication (MFA).

Solution: You implement an access package.

Does this solution meet the goal?

- ☐ Yes
- ☐ No

Question 10

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

Your company has deployed several virtual machines (VMs) on-premises and to Azure. Azure ExpressRoute has been deployed and configured for on-premises to Azure connectivity.

Several VMs are exhibiting network connectivity issues.

You need to analyze the network traffic to determine whether packets are being allowed or denied to the VMs.

Solution: Use Azure Advisor to analyze the network traffic.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

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Question 11

A company named Contoso, Ltd. has an Azure Active Directory (Azure AD) tenant that is integrated with Microsoft Office 365 and an Azure subscription.

Contoso has an on-premises identity infrastructure. The infrastructure includes servers that run Active Directory Domain Services (AD DS), Active Directory Federation Services (AD FS), Azure AD Connect, and Microsoft Identity Manager (MIM).

Contoso has a partnership with a company named Fabrikam, Inc. Fabrikam has an Active Directory forest and an Office 365 tenant. Fabrikam has the same on-premises identity infrastructure as Contoso.

A team of 10 developers from Fabrikam will work on an Azure solution that will be hosted in the Azure subscription of Contoso. The developers must be added to the Contributor role for a resource in the Contoso subscription.

You need to recommend a solution to ensure that Contoso can assign the role to the 10 Fabrikam developers. The solution must ensure that the Fabrikam developers use their existing credentials to access resources.

What should you recommend?

- ☐ Configure a forest trust between the on-premises Active Directory forests of Contoso and Fabrikam.
- ☐ Configure an organization relationship between the Office 365 tenants of Fabrikam and Contoso.
- ☐ In the Azure AD tenant of Contoso, enable Azure Active Directory Domain Services (Azure AD DS). Create a one-way forest trust that uses selective authentication between the Active Directory forests of Contoso and Fabrikam.
- ☐ In the Azure AD tenant of Contoso, create guest accounts for the Fabrikam developers.

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Question 12

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Your company has deployed several virtual machines (VMs) on-premises and to Azure. Azure ExpressRoute has been deployed and configured for on-premises to Azure connectivity.

Several VMs are exhibiting network connectivity issues.

You need to analyze the network traffic to determine whether packets are being allowed or denied to the VMs.

Solution: Install and configure the Log Analytics and Dependency Agents on all VMs. Use the Wire Data solution in Azure Log Analytics to analyze the network traffic.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

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Question 13

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You have an Azure subscription that contains a resource group named RG1.

You create an Azure Active Directory (Azure AD) group named ResearchUsers that contains the user accounts of all researchers.

You need to recommend a solution that meets the following requirements:

The researchers must be allowed to create Azure virtual machines.
The researchers must only be able to create Azure virtual machines by using specific Azure Resource Manager templates.

Solution: On RG1, assign the Contributor role to the ResearchUsers group. Create a custom Azure Policy definition and assign the policy to RG1.

Does this meet the goal?

- ☐ Yes
- ☐ No

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Question 14

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You have an Azure Active Directory (Azure AZD) tenant named contoso.com. The tenant contains a group named Group1. Group1 contains all the administrative user accounts.

You discover several login attempts to the Azure portal from countries where administrative users do NOT work.

You need to ensure that all login attempts to the Azure portal from those countries require Azure Multi-Factor Authentication (MFA).

Solution: Create an Access Review for Group1.

Does this solution meet the goal?

- ☐ Yes
- ☐ No

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Question 15

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You have an Azure subscription that contains a resource group named RG1.

You create an Azure Active Directory (Azure AD) group named ResearchUsers that contains the user accounts of all researchers.

You need to recommend a solution that meets the following requirements:

The researchers must be allowed to create Azure virtual machines.
The researchers must only be able to create Azure virtual machines by using specific Azure Resource Manager templates.

Solution: On RG1, assign a custom role-based access control (RBAC) role to the ResearchUsers group.

Does this meet the goal?

- ☐ Yes
- ☐ No

Question 16

You manage a single-domain, on-premises Active Directory forest named contoso.com. The forest functional level is Windows Server 2016.

You have several on-premises applications that depend on Active Directory.

You plan to migrate the applications to Azure.

You need to recommend an identity solution for the applications. The solution must meet the following requirements:

Eliminate the need for hybrid network connectivity.
Minimize management overhead for Active Directory.

What should you recommend?

- ☐ In Azure, deploy an additional child domain to the contoso.com forest.
- ☐ In Azure, deploy additional domain controllers for the contoso.com domain.
- ☐ Implement a new Active Directory forest in Azure.
- ☐ Implement Azure Active Directory Domain Services (Azure AD DS).

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Question 17

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

Your company has an on-premises data center and an Azure subscription. The on-premises data center contains a Hardware Security Module (HSM).

Your network contains an Active Directory domain that is synchronized to an Azure Active Directory (Azure AD) tenant.

The company is developing an application named Application1. Application1 will be hosted in Azure by using 10 virtual machines that run Windows Server 2016. Five virtual machines will be in the West Europe Azure region and five virtual machines will be in the East US Azure region. The virtual machines will store sensitive company information. All the virtual machines will use managed disks.

You need to recommend a solution to encrypt the virtual machine disks by using BitLocker Drive Encryption (BitLocker).

Solution:
Deploy one Azure key vault to each region
Export two security keys from the on-premises HSM
Import the security keys from the HSM into each Azure key vault
Create two Azure AD service principals
Configure the virtual machines to use Azure Disk Encryption
Specify a different service principal for the virtual machines in each region

Does this meet the goal?

- ☐ Yes
- ☐ No

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Question 18

You have a hybrid deployment of Azure Active Directory (Azure AD).

You need to recommend a solution to ensure that the Azure AD tenant can be managed only from the computers on your on-premises network.

What should you include in the recommendation?

- ☐ Azure AD roles and administrators
- ☐ a conditional access policy
- ☐ Azure AD Application Proxy
- ☐ Azure AD Privileged Identity Management

Question 19

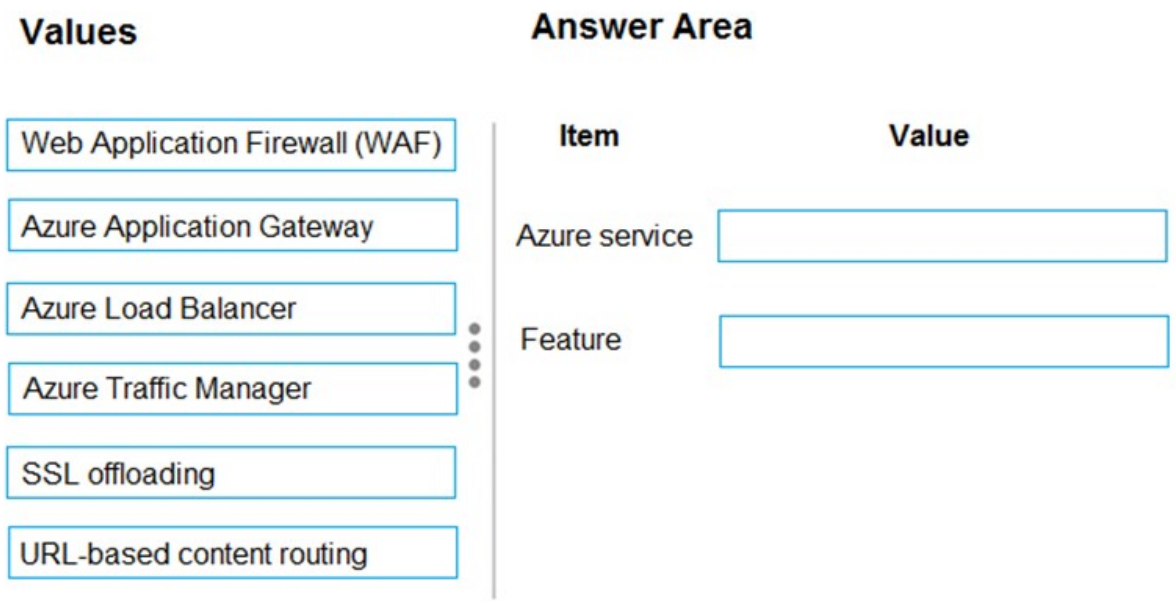
DRAG DROP

A company has an existing web application that runs on virtual machines (VMs) in Azure.

You need to ensure that the application is protected from SQL injection attempts and uses a layer-7 load balancer. The solution must minimize disruption to the code for the existing web application.

What should you recommend? To answer, drag the appropriate values to the correct items. Each value may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

NOTE: Each correct selection is worth one point.



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Question 20

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

Your company has an on-premises Active Directory Domain Services (AD DS) domain and an established Azure Active Directory (Azure AD) environment.

Your company would like users to be automatically signed in to cloud apps when they are on their corporate desktops that are connected to the corporate network.

You need to enable single sign-on (SSO) for company users.

Solution: Install and configure an Azure AD Connect server to use pass-through authentication and select the Enable single sign-on option.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

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Question 21

HOTSPOT

You are building an application that will run in a virtual machine (VM). The application will use Managed Service Identity (MSI).

The application uses Azure Key Vault, Azure SQL Database, and Azure Cosmos DB.

You need to ensure the application can use secure credentials to access these services.

Which authorization methods should you recommend? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Answer Area

Functionality	Authorization method
Azure Key Vault	Hash-based message authentication code (HMAC) Azure Managed Identity Role-Based Access Controls (RBAC) HTTPS encryption
Azure SQL	Hash-based message authentication code (HMAC) Azure Managed Identity Role-Based Access Controls (RBAC) HTTPS encryption
Cosmos DB	Hash-based message authentication code (HMAC) Azure Managed Identity Role-Based Access Controls (RBAC) HTTPS encryption

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Question 22

A company named Contoso Ltd., has a single-domain Active Directory forest named contoso.com.

Contoso is preparing to migrate all workloads to Azure. Contoso wants users to use single sign-on (SSO) when they access cloud-based services that integrate with Azure Active Directory (Azure AD).

You need to identify any objects in Active Directory that will fail to synchronize to Azure AD due to formatting issues. The solution must minimize costs.

What should you include in the solution?

- ☐ Azure Advisor
- ☐ Microsoft Office 365 IdFix
- ☐ Azure AD Connect Health
- ☐ Password Export Server version 3.1 (PES v3.1) in Active Directory Migration Tool (ADMT)

Question 23

Your company has several Azure subscriptions that are part of a Microsoft Enterprise Agreement.

The company's compliance team creates automatic alerts by using Azure Monitor.

You need to recommend a solution to apply the alerts automatically when new subscriptions are added to the Enterprise Agreement.

What should you include in the recommendation?

- ☐ Azure Automation runbooks
- ☐ Azure Log Analytics alerts
- ☐ Azure Monitor action groups
- ☐ Azure Resource Manager templates
- ☐ Azure Policy

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Question 24

You have an Azure Active Directory (Azure AD) tenant named contoso.com that contains several administrative user accounts.

You need to recommend a solution to identify which administrative user accounts have NOT signed in during the previous 30 days.

Which service should you include in the recommendation?

- ☐ Azure AD Identity Protection
- ☐ Azure Activity Log
- ☐ Azure Advisor
- ☐ Azure AD Privileged Identity Management (PIM)

Question 25

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You have an Azure Active Directory (Azure AZD) tenant named contoso.com. The tenant contains a group named Group1. Group1 contains all the administrative user accounts.

You discover several login attempts to the Azure portal from countries where administrative users do NOT work.

You need to ensure that all login attempts to the Azure portal from those countries require Azure Multi-Factor Authentication (MFA).

Solution: Implement Azure AD Privileged Identity Management.

Does this solution meet the goal?

- ☐ Yes
- ☐ No

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Question 26

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Your company has an on-premises Active Directory Domain Services (AD DS) domain and an established Azure Active Directory (Azure AD) environment.

Your company would like users to be automatically signed in to cloud apps when they are on their corporate desktops that are connected to the corporate network.

You need to enable single sign-on (SSO) for company users.

Solution: Install and configure an Azure AD Connect server to use password hash synchronization and select the Enable single sign-on option.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

Question 27

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

Your company has deployed several virtual machines (VMs) on-premises and to Azure. Azure ExpressRoute has been deployed and configured for on-premises to Azure connectivity.

Several VMs are exhibiting network connectivity issues.

You need to analyze the network traffic to determine whether packets are being allowed or denied to the VMs.

Solution: Use the Azure traffic analytics solution in Azure Log Analytics to analyze the network traffic.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

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Question 28

You have an Azure Active Directory (Azure AD) tenant named contoso.com that contains two administrative user accounts named Admin1 and Admin2.

You create two Azure virtual machines named VM1 and VM2.

You need to ensure that Admin1 and Admin2 are notified when more than five events are added to the security log of VM1 or VM2 during a period of 120 seconds. The solution must minimize administrative tasks.

What should you create?

- ☐ two action groups and one alert rule
- ☐ one action group and one alert rule
- ☐ five action groups and one alert rule
- ☐ two action groups and two alert rules

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Question 29

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You have an Azure subscription named Project1. Only a group named Project1admins is assigned roles in the Project1 subscription. The Project1 subscription contains all the resources for an application named Application1.

Your company is developing a new application named Application2. The members of the Application2 development team belong to an Azure Active Directory (Azure AD) group named App2Dev.

You identify the following requirements for Application2:

The members of App2Dev must be prevented from changing the role assignments in Azure.
The members of App2Dev must be able to create new Azure resources required by Application2.
All the required role assignments for Application2 will be performed by the members of Project1admins.

You need to recommend a solution for the role assignments of Application2.

Solution: In Project1, create a network security group (NSG) named NSG1. Assign Project1admins the Owner role for NSG1. Assign the App2Dev the Contributor role for NSG1.

Does this meet the goal?

- ☐ Yes
- ☐ No

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Question 30

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

Your company has an on-premises Active Directory Domain Services (AD DS) domain and an established Azure Active Directory (Azure AD) environment.

Your company would like users to be automatically signed in to cloud apps when they are on their corporate desktops that are connected to the corporate network.

You need to enable single sign-on (SSO) for company users.

Solution: Configure an AD DS server in an Azure virtual machine (VM). Configure bidirectional replication.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

Question 31

Your network contains an on-premises Active Directory forest named contoso.com. The forest is synced to an Azure Active Directory (Azure AD) tenant named contoso.com and an Azure AD Domain Services (Azure AD DS) domain named contoso-aad.com.

You have an Azure Storage account named Storage1 that contains a file share named Share1.

You configure NTFS permissions on Share1. You plan to deploy a virtual machine that will be used by several users to access Share1.

You need to ensure that the users can access Share1.

Which type virtual machine should you deploy?

- ☐ a virtual machine that runs Windows Server 2016 and is joined to the contoso.com domain
- ☐ a virtual machine that runs Windows 10 and is joined to the contoso-add.com domain
- ☐ a virtual machine that runs Windows 10 and is hybrid Azure AD joined to the contoso.com domain
- ☐ an Azure virtual machine that runs Windows Server 2016 and is joined to the contoso-add.com domain

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Question 32

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

Your company has deployed several virtual machines (VMs) on-premises and to Azure. Azure ExpressRoute has been deployed and configured for on-premises to Azure connectivity.

Several VMs are exhibiting network connectivity issues.

You need to analyze the network traffic to determine whether packets are being allowed or denied to the VMs.

Solution: Use Azure Network Watcher to run IP flow verify to analyze the network traffic.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

Question 33

You are designing a security solution for a company's Azure Active Directory (Azure AD). The company currently uses Azure AD Premium for all employees. Contractors will periodically access the corporate network based on demand.

You must ensure that all employees and contractors are required to log on by using two-factor authentication. The solution must minimize costs.

You need to recommend a solution.

What should you recommend?

- ☐ Purchase Azure Multi-Factor Authentication licenses for the employees and the contractors
- ☐ Use the Multi-Factor Authentication provider in Azure and configure the usage model for each authentication type
- ☐ Use the Multi-Factor Authentication provider in Azure and configure the usage model for each enabled user
- ☐ Purchase Azure Multi-Factor Authentication licenses for the contractors only

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Question 34

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

Your company has an on-premises data center and an Azure subscription. The on-premises data center contains a Hardware Security Module (HSM).

Your network contains an Active Directory domain that is synchronized to an Azure Active Directory (Azure AD) tenant.

The company is developing an application named Application1. Application1 will be hosted in Azure by using 10 virtual machines that run Windows Server 2016. Five virtual machines will be in the West Europe Azure region and five virtual machines will be in the East US Azure region. The virtual machines will store sensitive company information. All the virtual machines will use managed disks.

You need to recommend a solution to encrypt the virtual machine disks by using BitLocker Drive Encryption (BitLocker).

Solution: Export a security key from the on-premises HSM. Create one Azure AD service principal. Configure the virtual machines to use Azure Storage Service Encryption.

Does this meet the goal?

- ☐ Yes
- ☐ No

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Design a Data Platform Solution

Case Study (2 questions)

Case study
This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study
To display the first question in this case study, click the Next button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirement, existing environment, and problem statements. If the case study has an All Information tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the Question button to return to the question.
Overview

Contoso, Ltd. is a US-based financial services company that has a main office in New York and a branch office in San Francisco.

Existing Environment
Payment Processing System

Contoso hosts a business-critical payment processing system in its New York data center. The system has three tiers: a front-end web app, a middle-tier web API, and a back-end data store implemented as a Microsoft SQL Server 2014 database. All servers run Windows Server 2012 R2.

The front-end and middle-tier components are hosted by using Microsoft Internet Information Services (IIS). The application code is written in C# and ASP.NET. The middle-tier API uses the Entity Framework to communicate to the SQL Server database. Maintenance of the database is performed by using SQL Server Agent jobs.

The database is currently 2 TB and is not expected to grow beyond 3 TB.

The payment processing system has the following compliance-related requirements:

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Encrypt data in transit and at rest. Only the front-end and middle-tier components must be able to access the encryption keys that protect the data store.
Keep backups of the data in two separate physical locations that are at least 200 miles apart and can be restored for up to seven years.
Support blocking inbound and outbound traffic based on the source IP address, the destination IP address, and the port number.
Collect Windows security logs from all the middle-tier servers and retain the logs for a period of seven years.
Inspect inbound and outbound traffic from the front-end tier by using highly available network appliances.
Only allow all access to all the tiers from the internal network of Contoso.

Tape backups are configured by using an on-premises deployment of Microsoft System Center Data Protection Manager (DPM), and then shipped offsite for long term storage.

Historical Transaction Query System

Contoso recently migrated a business-critical workload to Azure. The workload contains a .NET web service for querying the historical transaction data residing in Azure Table Storage. The .NET web service is accessible from a client app that was developed in-house and runs on the client computers in the New York office. The data in the table storage is 50 GB and is not expected to increase.

Current Issues

The Contoso IT team discovers poor performance of the historical transaction query system, at the queries frequently cause table scans.

Requirements
Planned Changes

Contoso plans to implement the following changes:

Migrate the payment processing system to Azure.
Migrate the historical transaction data to Azure Cosmos DB to address the performance issues.
Migration Requirements

Contoso identifies the following general migration requirements:

Infrastructure services must remain available if a region or a data center fails. Failover must occur without any administrative intervention.
Whenever possible, Azure managed services must be used to minimize management overhead.
Whenever possible, costs must be minimized.

Contoso identifies the following requirements for the payment processing system:

If a data center fails, ensure that the payment processing system remains available without any administrative intervention. The middle-tier and the web front end must continue to operate without any additional configurations.

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Ensure that the number of compute nodes of the front-end and the middle tiers of the payment processing system can increase or decrease automatically based on CPU utilization.
Ensure that each tier of the payment processing system is subject to a Service Level Agreement (SLA) of 99.99 percent availability.
Minimize the effort required to modify the middle-tier API and the back-end tier of the payment processing system.
Generate alerts when unauthorized login attempts occur on the middle-tier virtual machines.
Ensure that the payment processing system preserves its current compliance status.
Host the middle tier of the payment processing system on a virtual machine.

Contoso identifies the following requirements for the historical transaction query system:

Minimize the use of on-premises infrastructure services.
Minimize the effort required to modify the .NET web service querying Azure Cosmos DB.
Minimize the frequency of table scans.
If a region fails, ensure that the historical transactions query system remains available without any administrative intervention.
Information Security Requirements

The IT security team wants to ensure that identity management is performed by using Active Directory. Password hashes must be stored on-premises only.

Access to all business-critical systems must rely on Active Directory credentials. Any suspicious authentication attempts must trigger a multi-factor authentication prompt automatically. legitimate users must be able to authenticate successfully by using multi-factor authentication.

Question 35

You need to recommend a solution for implementing the back-end tier of the payment processing system in Azure.

What should you include in the recommendation?

- ☐ an Azure SQL Database managed instance
- ☐ a SQL Server database on an Azure virtual machine
- ☐ an Azure SQL Database single database
- ☐ an Azure SQL Database elastic pool

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Question 36

You need to recommend a solution for protecting the content of the payment processing system.

What should you include in the recommendation?

- ☐ Transparent Data Encryption (TDE)
- ☐ Azure Storage Service Encryption
- ☐ Always Encrypted with randomized encryption
- ☐ Always Encrypted with deterministic encryption

(8 questions)

Question 37

You have 100 servers that run Windows Server 2012 R2 and host Microsoft SQL Server 2012 R2 instances. The instances host databases that have the following characteristics:

The largest database is currently 3 TB. None of the databases will ever exceed 4 TB.
Stored procedures are implemented by using CLR.

You plan to move all the data from SQL Server to Azure.

You need to recommend an Azure service to host the databases. The solution must meet the following requirements:

Whenever possible, minimize management overhead for the migrated databases.
Minimize the number of database changes required to facilitate the migration.
Ensure that users can authenticate by using their Active Directory credentials.

What should you include in the recommendation?

- ☐ Azure SQL Database single databases
- ☐ Azure SQL Database Managed Instance
- ☐ Azure SQL Database elastic pools
- ☐ SQL Server 2016 on Azure virtual machines

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Question 38

You have an Azure subscription that contains an Azure Cosmos DB account.

You need to recommend a solution to generate an alert from Azure Log Analytics when a request charge for a query exceeds 50 request units more than 20 times within a 15-minute window.

What should you recommend?

- ☐ Create a search query to identify when requestCharge_s exceeds 50. Configure an alert threshold of 20 and a period of 15.
- ☐ Create a search query to identify when duration_s exceeds 20 and requestCharge_s exceeds 50. Configure a period of 15.
- ☐ Create a search query to identify when requestCharge_s exceeds 20. Configure a period of 15 and a frequency of 20.
- ☐ Create a search query to identify when duration_s exceeds 20. Configure a period of 15.

Question 39

You plan to create an Azure Cosmos DB account that uses the SQL API. The account will contain data added by a web application. The web application will send data daily.

You need to recommend a notification solution that meets the following requirements:

Sends email notification when data is received from IoT devices.
Minimizes compute cost.

What should you include in the recommendation?

- ☐ Deploy an Azure logic app that has the Azure Cosmos DB connector configured to use a SendGrid action.
- ☐ Deploy a function app that is configured to use the Consumption plan and a SendGrid binding.
- ☐ Deploy an Azure logic app that has a SendGrid connector configured to use an Azure Cosmos DB action.
- ☐ Deploy a function app that is configured to use the Consumption plan and an Azure Event Hubs binding.

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Question 40

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing an Azure solution for a company that has four departments. Each department will deploy several Azure app services and Azure SQL databases.

You need to recommend a solution to report the costs for each department to deploy the app services and the databases. The solution must provide a consolidated view for cost reporting.

Solution: Create a new subscription for each department.

Does this meet the goal?

- ☐ Yes
- ☐ No

Question 41

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing an Azure solution for a company that has four departments. Each department will deploy several Azure app services and Azure SQL databases.

You need to recommend a solution to report the costs for each department to deploy the app services and the databases. The solution must provide a consolidated view for cost reporting.

Solution: Place all resources in the same resource group. Assign tags to each resource.

Does this meet the goal?

- ☐ Yes
- ☐ No

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Question 42

You have Azure virtual machines that run a custom line-of-business web application.

You plan to use a third-party solution to parse event logs from the virtual machines stored in an Azure storage account.

You need to recommend a solution to save the event logs from the virtual machines to the Azure Storage account. The solution must minimize costs and complexity.

What should you include in the recommendation?

- ☐ Azure VM Diagnostics Extension
- ☐ Azure Monitor Metrics
- ☐ event log subscriptions
- ☐ Azure Monitor Logs

Question 43

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing an Azure solution for a company that has four departments. Each department will deploy several Azure app services and Azure SQL databases.

You need to recommend a solution to report the costs for each department to deploy the app services and the databases. The solution must provide a consolidated view for cost reporting.

Solution: Create a resources group for each resource type. Assign tags to each resource group.

Does this meet the goal?

- ☐ Yes
- ☐ No

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Question 44

You are designing a data protection strategy for Azure virtual machines. All the virtual machines are in the Standard tier and use managed disks.

You need to recommend a solution that meets the following requirements:

The use of encryption keys is audited.
All the data is encrypted at rest always.
You manage the encryption keys, not Microsoft.

What should you include in the recommendation?

- ☐ BitLocker Drive Encryption (BitLocker)
- ☐ Azure Storage Service Encryption
- ☐ client-side encryption
- ☐ Azure Disk Encryption

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Design a Business Continuity Strategy

Case Study (2 questions)

Case study
This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study
To display the first question in this case study, click the Next button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirement, existing environment, and problem statements. If the case study has an All Information tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the Question button to return to the question.
Overview

Contoso, Ltd. is a US-based financial services company that has a main office in New York and a branch office in San Francisco.

Existing Environment
Payment Processing System

Contoso hosts a business-critical payment processing system in its New York data center. The system has three tiers: a front-end web app, a middle-tier web API, and a back-end data store implemented as a Microsoft SQL Server 2014 database. All servers run Windows Server 2012 R2.

The front-end and middle-tier components are hosted by using Microsoft Internet Information Services (IIS). The application code is written in C# and ASP.NET. The middle-tier API uses the Entity Framework to communicate to the SQL Server database. Maintenance of the database is performed by using SQL Server Agent jobs.

The database is currently 2 TB and is not expected to grow beyond 3 TB.

The payment processing system has the following compliance-related requirements:

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Encrypt data in transit and at rest. Only the front-end and middle-tier components must be able to access the encryption keys that protect the data store.
Keep backups of the data in two separate physical locations that are at least 200 miles apart and can be restored for up to seven years.
Support blocking inbound and outbound traffic based on the source IP address, the destination IP address, and the port number.
Collect Windows security logs from all the middle-tier servers and retain the logs for a period of seven years.
Inspect inbound and outbound traffic from the front-end tier by using highly available network appliances.
Only allow all access to all the tiers from the internal network of Contoso.

Tape backups are configured by using an on-premises deployment of Microsoft System Center Data Protection Manager (DPM), and then shipped offsite for long term storage.

Historical Transaction Query System

Contoso recently migrated a business-critical workload to Azure. The workload contains a .NET web service for querying the historical transaction data residing in Azure Table Storage. The .NET web service is accessible from a client app that was developed in-house and runs on the client computers in the New York office. The data in the table storage is 50 GB and is not expected to increase.

Current Issues

The Contoso IT team discovers poor performance of the historical transaction query system, at the queries frequently cause table scans.

Requirements
Planned Changes

Contoso plans to implement the following changes:

Migrate the payment processing system to Azure.
Migrate the historical transaction data to Azure Cosmos DB to address the performance issues.
Migration Requirements

Contoso identifies the following general migration requirements:

Infrastructure services must remain available if a region or a data center fails. Failover must occur without any administrative intervention.
Whenever possible, Azure managed services must be used to minimize management overhead.
Whenever possible, costs must be minimized.

Contoso identifies the following requirements for the payment processing system:

If a data center fails, ensure that the payment processing system remains available without any administrative intervention. The middle-tier and the web front end must continue to operate without any additional configurations.

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Ensure that the number of compute nodes of the front-end and the middle tiers of the payment processing system can increase or decrease automatically based on CPU utilization.
Ensure that each tier of the payment processing system is subject to a Service Level Agreement (SLA) of 99.99 percent availability.
Minimize the effort required to modify the middle-tier API and the back-end tier of the payment processing system.
Generate alerts when unauthorized login attempts occur on the middle-tier virtual machines.
Ensure that the payment processing system preserves its current compliance status.
Host the middle tier of the payment processing system on a virtual machine.

Contoso identifies the following requirements for the historical transaction query system:

Minimize the use of on-premises infrastructure services.
Minimize the effort required to modify the .NET web service querying Azure Cosmos DB.
Minimize the frequency of table scans.
If a region fails, ensure that the historical transactions query system remains available without any administrative intervention.
Information Security Requirements

The IT security team wants to ensure that identity management is performed by using Active Directory. Password hashes must be stored on-premises only.

Access to all business-critical systems must rely on Active Directory credentials. Any suspicious authentication attempts must trigger a multi-factor authentication prompt automatically. legitimate users must be able to authenticate successfully by using multi-factor authentication.

Question 45

You need to recommend a disaster recovery solution for the back-end tier of the payment processing system.

What should you include in the recommendation?

- ☐ Always On Failover Cluster Instances
- ☐ active geo-replication
- ☐ Azure Site Recovery
- ☐ an auto-failover group

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Question 46

You need to recommend a high-availability solution for the middle tier of the payment processing system.

What should you include in the recommendation?

- ☐ the Isolated App service plan
- ☐ availability zones
- ☐ an availability set
- ☐ the Premium App Service plan

(6 questions)

Question 47

You plan to use Azure Site Recovery to protect several on-premises physical server workloads. Each server workload is independent of the other. The workloads are stateless.

You need to recommend a failover strategy to ensure that if the on-premises data center fails, the workloads are available in Azure as quickly as possible.

Which failover strategy should you include in the recommendation?

- ☐ Latest
- ☐ Latest app-consistent
- ☐ Latest multi-VM processed
- ☐ Latest processed

Question 48

The accounting department at your company migrates to a new financial accounting software. The accounting department must keep file-based database backups for seven years for compliance purposes. It is unlikely that the backups will be used to recover data.

You need to move the backups to Azure. The solution must minimize costs.

Where should you store the backups?

- ☐ Azure SQL Database
- ☐ Azure Blob storage that uses the Archive tier
- ☐ a Recovery Services vault
- ☐ Azure Blob storage that uses the Cool tier

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Question 49

You plan to move a web application named App1 from an on-premises data center to Azure.

App1 depends on a custom COM component that is installed on the host server.

You need to recommend a solution to host App1 in Azure. The solution must meet the following requirements:

App1 must be available to users if an Azure data center becomes unavailable.
Costs must be minimized.

What should you include in the recommendation?

- ☐ In two Azure regions, deploy a Traffic Manager profile and a web app.
- ☐ In two Azure regions, deploy a load balancer and a virtual machine scale set.
- ☐ Deploy a load balancer and a virtual machine scale set across two availability zones.
- ☐ In two Azure regions, deploy a load balancer and a web app.

Question 50

You plan to deploy a payroll system to Azure. The payroll system will use Azure virtual machines that run SUSE Linux Enterprise Server and Windows.

You need to recommend a business continuity solution for the payroll system. The solution must meet the following requirements:

Minimize costs.
Provide business continuity if an Azure region fails.
Provide a recovery time objective (RTO) of 120 minutes.
Provide a recovery point objective (RPO) of five minutes.

What should you include in the recommendation?

- ☐ Microsoft System Center Data Protection Manager (DPM)
- ☐ Azure Site Recovery
- ☐ unmanaged disks that use geo-redundant storage (GRS)
- ☐ Azure Backup

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Question 51

HOTSPOT

You have 20 Azure virtual machines that run Windows Server 2016 based on a custom virtual machine image. Each virtual machine hosts an instance of a VSS-capable web app that was developed in-house. Each instance is accessed by using a public endpoint. Each instance uses a separate database. The average database size is 200 GB.

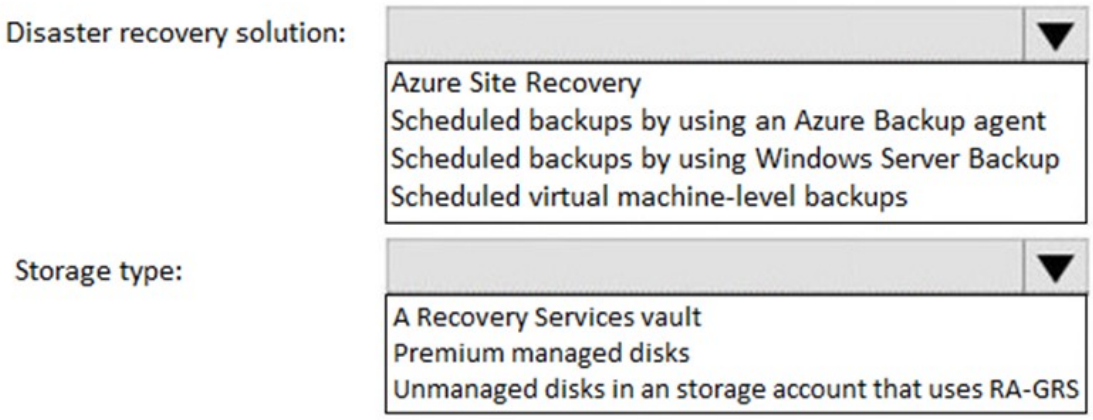
You need to design a disaster recovery solution for individual instances. The solution must meet the following requirements:

Provide a recovery time objective (RTO) of six hours
Provide a recovery point objective (RPO) of eight hours
Support recovery to a different Azure region
Support VSS-based backups
Minimize costs

What should you include in the recommendation? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Answer Area



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Question 52

You plan to store data in Azure Blob storage for many years. The stored data will be accessed rarely.

You need to ensure that the data in Blob storage is always available for immediate access. The solution must minimize storage costs.

Which storage tier should you use?

- ☐ Cool
- ☐ Archive
- ☐ Hot

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Design for Deployment, Migration and Integration

Case Study (1 questions)

Case study
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Overview

Fabrikam, Inc. is an engineering company that has offices throughout Europe. The company has a main office in London and three branch offices in Amsterdam, Berlin, and Rome.

Existing Environment
Active Directory Environment

The network contains two Active Directory forests named corp.fabrikam.com and rd.fabrikam.com. There are no trust relationships between the forests.

Corp.fabrikam.com is a production forest that contains identities used for internal user and computer authentication.

Rd.fabrikam.com is used by the research and development (R&D) department only.

Network Infrastructure

Each office contains at least one domain controller from the corp.fabrikam.com domain. The main office contains all the domain controllers for the rd.fabrikam.com forest.

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All the offices have a high-speed connection to the Internet.

An existing application named WebApp1 is hosted in the data center of the London office. WebApp1 is used by customers to place and track orders.

WebApp1 has a web tier that uses Microsoft Internet Information Services (IIS) and a database tier that runs Microsoft SQL Server 2016. The web tier and the database tier are deployed to virtual machines that run on Hyper-V.

The IT department currently uses a separate Hyper-V environment to test updates to WebApp1.

Fabrikam purchases all Microsoft licenses through a Microsoft Enterprise Agreement that includes Software Assurance.

Problem Statements

The use of Web App1 is unpredictable. At peak times, users often report delays. At other times, many resources for WebApp1 are underutilized.

Requirements
Planned Changes

Fabrikam plans to move most of its production workloads to Azure during the next few years.

As one of its first projects, the company plans to establish a hybrid identity model, facilitating an upcoming Microsoft Office 365 deployment.

All R&D operations will remain on-premises.

Fabrikam plans to migrate the production and test instances of WebApp1 to Azure.

Technical Requirements

Fabrikam identifies the following technical requirements:

Web site content must be easily updated from a single point.
User input must be minimized when provisioning new app instances.
Whenever possible, existing on-premises licenses must be used to reduce cost.
Users must always authenticate by using their corp.fabrikam.com UPN identity.
Any new deployments to Azure must be redundant in case an Azure region fails.
Whenever possible, solutions must be deployed to Azure by using platform as a service (PaaS).
An email distribution group named IT Support must be notified of any issues relating to the directory synchronization services.
Directory synchronization between Azure Active Directory (Azure AD) and corp.fabrikam.com must not be affected by a link failure between Azure and the on-premises network.
Database Requirements

Fabrikam identifies the following database requirements:

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Database metrics for the production instance of WebApp1, must be available for analysis so that database administrators can optimize the performance settings.
To avoid disrupting customer access, database downtime must be minimized when databases are migrated.
Database backups must be retained for a minimum of seven years to meet compliance requirements.
Security Requirements

Fabrikam identifies the following security requirements:

Company information including policies, templates, and data must be inaccessible to anyone outside the company.
Users on the on-premises network must be able to authenticate to corp.fabrikam.com if an Internet link fails.
Administrators must be able authenticate to the Azure portal by using their corp.fabrikam.com credentials.
All administrative access to the Azure portal must be secured by using multi-factor authentication.
The testing of WebApp1 updates must not be visible to anyone outside the company.

Question 53

You need to recommend a strategy for migrating the database content of WebApp1 to Azure.

What should you include in the recommendation?

- ☐ Use Azure Site Recovery to replicate the SQL servers to Azure
- ☐ Use SQL Server transactional replication
- ☐ Copy the VHD that contains the Azure SQL database files to Azure Blob storage
- ☐ Copy the BACPAC file that contains the Azure SQL database files to Azure Blob storage

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(9 questions)

Question 54

You have 100 Microsoft SQL Server Integration Services (SSIS) packages that are configured to use 10 on-premises SQL Server databases as their destinations.

You plan to migrate the 10 on-premises databases to Azure SQL Database.

You need to recommend a solution to host the SSIS packages in Azure. The solution must ensure that the packages can target the SQL Database instances as their destinations.

What should you include in the recommendation?

- ☐ SQL Server Migration Assistant (SSMA)
- ☐ Azure Data Factory
- ☐ Data Migration Assistant
- ☐ Azure Data Catalog

Question 55

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

A company has custom ASP.NET and Java applications that run old versions of Windows and Linux. The company plans to place applications in containers.

You need to design a solution that includes networking, service discovery, and load balancing for the applications. The solution must support storage orchestration.

Solution: You deploy each application to an Azure Container instance.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

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Question 56

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing an Azure solution for a company that wants to move a .NET Core web application from an on-premises data center to Azure. The web application relies on a Microsoft SQL Server 2016 database on Windows Server 2016. The database server will not move to Azure.

A separate networking team is responsible for configuring network permissions.

The company uses Azure ExpressRoute and has an ExpressRoute gateway connected to an Azure virtual network named VNET1.

You need to recommend a solution for deploying the web application.

Solution:
Deploy the web application to a web app hosted in a Standard App Service plan. Create and configure an Azure App Service Hybrid Connections endpoint.
On the on-premises network, deploy the Hybrid Connection Manager. Configure the Hybrid Connection Manager to access both the Hybrid Connection endpoint and the SQL Server instance.

Does this meet the goal?

- ☐ Yes
- ☐ No

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Question 57

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

A company has custom ASP.NET and Java applications that run old versions of Windows and Linux. The company plans to place applications in containers.

You need to design a solution that includes networking, service discovery, and load balancing for the applications. The solution must support storage orchestration.

Solution: Deploy a Kubernetes cluster that has the desired number of instances of the applications.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

Question 58

You have an on-premises deployment of MongoDB.

You plan to migrate MongoDB to an Azure Cosmos DB account that uses the MongoDB API.

You need to recommend a solution for migrating MongoDB to Azure Cosmos DB.

What should you include in the recommendation?

- ☐ mongorestore
- ☐ Data Migration Assistant
- ☐ Azure Storage Explorer
- ☐ Azure Cosmos DB Data Migration Tool

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Question 59

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

A company has custom ASP.NET and Java applications that run old versions of Windows and Linux. The company plans to place applications in containers.

You need to design a solution that includes networking, service discovery, and load balancing for the applications. The solution must support storage orchestration.

Solution: You create an Azure virtual network, public IP address, and load balancer. Then add virtual machines (VMs) to the solution and deploy individual containers on them.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

Question 60

Your company has 300 virtual machines hosted in a Vmware environment. The virtual machines vary in size and have various utilization levels.

You plan to move all the virtual machines to Azure.

You need to recommend how many and what size Azure virtual machines will be required to move the current workloads to Azure. The solution must minimize administrative effort.

What should you use to make the recommendation?

- ☐ Azure Advisor
- ☐ Azure Migrate
- ☐ Azure Pricing calculator
- ☐ Azure Cost Management

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Question 61

You manage an application instance. The application consumes data from multiple databases. Application code references database tables using a combination of the server, database, and table name.

You need to migrate the application instance to Azure.

What are two possible ways to achieve this goal? Each correct answer presents a complete solution.

NOTE: Each correct selection is worth one point.

- ☐ SQL Server Stretch Database
- ☐ SQL Server in an Azure virtual machine
- ☐ Azure SQL Database
- ☐ SQL Managed Instance

Question 62

Your company plans to publish APIs for its services by using Azure API Management.

You discover that service responses include the AspNet-Version header.

You need to recommend a solution to remove AspNet-Version from the response of the published APIs.

What should you include in the recommendation?

- ☐ a new product
- ☐ a modification to the URL scheme
- ☐ a new policy
- ☐ a new revision

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Design an Infrastructure Strategy

Case Study (1 questions)

Case study
This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study
To display the first question in this case study, click the Next button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirement, existing environment, and problem statements. If the case study has an All Information tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the Question button to return to the question.
Overview

Contoso, Ltd. is a US-based financial services company that has a main office in New York and a branch office in San Francisco.

Existing Environment
Payment Processing System

Contoso hosts a business-critical payment processing system in its New York data center. The system has three tiers: a front-end web app, a middle-tier web API, and a back-end data store implemented as a Microsoft SQL Server 2014 database. All servers run Windows Server 2012 R2.

The front-end and middle-tier components are hosted by using Microsoft Internet Information Services (IIS). The application code is written in C# and ASP.NET. The middle-tier API uses the Entity Framework to communicate to the SQL Server database. Maintenance of the database is performed by using SQL Server Agent jobs.

The database is currently 2 TB and is not expected to grow beyond 3 TB.

The payment processing system has the following compliance-related requirements:

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Encrypt data in transit and at rest. Only the front-end and middle-tier components must be able to access the encryption keys that protect the data store.
Keep backups of the data in two separate physical locations that are at least 200 miles apart and can be restored for up to seven years.
Support blocking inbound and outbound traffic based on the source IP address, the destination IP address, and the port number.
Collect Windows security logs from all the middle-tier servers and retain the logs for a period of seven years.
Inspect inbound and outbound traffic from the front-end tier by using highly available network appliances.
Only allow all access to all the tiers from the internal network of Contoso.

Tape backups are configured by using an on-premises deployment of Microsoft System Center Data Protection Manager (DPM), and then shipped offsite for long term storage.

Historical Transaction Query System

Contoso recently migrated a business-critical workload to Azure. The workload contains a .NET web service for querying the historical transaction data residing in Azure Table Storage. The .NET web service is accessible from a client app that was developed in-house and runs on the client computers in the New York office. The data in the table storage is 50 GB and is not expected to increase.

Current Issues

The Contoso IT team discovers poor performance of the historical transaction query system, at the queries frequently cause table scans.

Requirements
Planned Changes

Contoso plans to implement the following changes:

Migrate the payment processing system to Azure.
Migrate the historical transaction data to Azure Cosmos DB to address the performance issues.
Migration Requirements

Contoso identifies the following general migration requirements:

Infrastructure services must remain available if a region or a data center fails. Failover must occur without any administrative intervention.
Whenever possible, Azure managed services must be used to minimize management overhead.
Whenever possible, costs must be minimized.

Contoso identifies the following requirements for the payment processing system:

If a data center fails, ensure that the payment processing system remains available without any administrative intervention. The middle-tier and the web front end must continue to operate without any additional configurations.

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Ensure that the number of compute nodes of the front-end and the middle tiers of the payment processing system can increase or decrease automatically based on CPU utilization.
Ensure that each tier of the payment processing system is subject to a Service Level Agreement (SLA) of 99.99 percent availability.
Minimize the effort required to modify the middle-tier API and the back-end tier of the payment processing system.
Generate alerts when unauthorized login attempts occur on the middle-tier virtual machines.
Ensure that the payment processing system preserves its current compliance status.
Host the middle tier of the payment processing system on a virtual machine.

Contoso identifies the following requirements for the historical transaction query system:

Minimize the use of on-premises infrastructure services.
Minimize the effort required to modify the .NET web service querying Azure Cosmos DB.
Minimize the frequency of table scans.
If a region fails, ensure that the historical transactions query system remains available without any administrative intervention.
Information Security Requirements

The IT security team wants to ensure that identity management is performed by using Active Directory. Password hashes must be stored on-premises only.

Access to all business-critical systems must rely on Active Directory credentials. Any suspicious authentication attempts must trigger a multi-factor authentication prompt automatically. legitimate users must be able to authenticate successfully by using multi-factor authentication.

Question 63

You need to recommend a compute solution for the middle tier of the payment processing system.

What should you include in the recommendation?

- ☐ Azure Kubernetes Service (AKS)
- ☐ virtual machine scale sets
- ☐ availability sets
- ☐ App Service Environments (ASEs)

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(32 questions)

Question 64

You manage on-premises networks and Azure virtual networks.

You need a secure private connection between the on-premises networks and the Azure virtual networks. The connection must offer a redundant pair of cross connections to provide high availability.

What should you recommend?

- ☐ ExpressRoute
- ☐ Azure Load Balancer
- ☐ virtual network peering
- ☐ VPN Gateway

Question 65

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are migrating an on-premises application to Azure. One component of the application is a legacy Windows native executable that performs image processing.

The image processing application must run every hour. During times that the image processing application is not running, it should not be consuming any Azure compute resources.

You need to ensure that the image processing application runs correctly every hour.

Solution: Create a Logic App to run the image processing application every hour.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

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Question 66

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing a storage solution to support on-premises resources and Azure-hosted resources.

You need to provide on-premises storage that has built-in replication to Azure.

Solution: You include Azure Data Table Storage in the design.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

Question 67

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You need to deploy resources to host a stateless web app in an Azure subscription. The solution must meet the following requirements:

Provide access to the full .NET framework.
Provide redundancy if an Azure region fails.
Grant administrators access to the operating system to install custom application dependencies.

Solution: You deploy a web app in an Isolated App Service plan.

Does this meet the goal?

- ☐ Yes
- ☐ No

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Question 68

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You need to deploy resources to host a stateless web app in an Azure subscription. The solution must meet the following requirements:

Provide access to the full .NET framework.
Provide redundancy if an Azure region fails.
Grant administrators access to the operating system to install custom application dependencies.

Solution: You deploy an Azure virtual machine to two Azure regions, and you deploy an Azure Application Gateway.

Does this meet the goal?

- ☐ Yes
- ☐ No

Question 69

You use a virtual network to extend an on-premises IT environment into the cloud. The virtual network has two virtual machines (VMs) that store sensitive data.

The data must only be available using internal communication channels. Internet access to those VMs is not permitted.

You need to ensure that the VMs cannot access the Internet.

Which two options should you recommend? Each correct answer presents a complete solution.

NOTE: Each correct selection is worth one point.

- ☐ network interface (NIC)
- ☐ Source Network Address Translation (SNAT)
- ☐ Azure ExpressRoute
- ☐ Network Security Groups (NSG)

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Question 70

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing an Azure solution for a company that wants to move a .NET Core web application from an on-premises data center to Azure. The web application relies on a Microsoft SQL Server 2016 database on Windows Server 2016. The database server will not move to Azure.

A separate networking team is responsible for configuring network permissions.

The company uses Azure ExpressRoute and has an ExpressRoute gateway connected to an Azure virtual network named VNET1.

You need to recommend a solution for deploying the web application.

Solution: Deploy the web application to a web app hosted in a Premium App Service plan. Configure VNET Integration for the App Service plan.

Does this meet the goal?

- ☐ Yes
- ☐ No

Question 71

Your company plans to migrate its on-premises data to Azure.

You need to recommend which Azure services can be used to store the data. The solution must meet the following requirements:

Encrypt all data while at rest.
Encrypt data only by using a key generated by the company.

Which two possible services can you recommend? Each correct answer presents a complete solution.

NOTE: Each correct selection is worth one point.

- ☐ Azure Table storage
- ☐ Azure Backup
- ☐ Azure Blob storage
- ☐ Azure Queue storage
- ☐ Azure Files

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Question 72

You have a .NET web service named Service1 that has the following requirements:

Must read and write temporary files to the local file system.
Must write to the Windows Application event log.

You need to recommend a solution to host Service1 in Azure. The solution must meet the following requirements:

Minimize maintenance overhead.
Minimize costs.

What should you include in the recommendation?

- ☐ an Azure virtual machine scale set
- ☐ an Azure function
- ☐ an App Service Environment
- ☐ an Azure web app

Question 73

You manage a solution in Azure.

You must collect usage data including MAC addresses from all devices on the network.

You need to recommend a monitoring solution.

What should you recommend?

- ☐ Activity Log Analytics
- ☐ Azure Network Security Group Analytics
- ☐ Network Performance Monitor
- ☐ Azure Application Gateway Analytics
- ☐ Azure Wire Data

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Question 74

You plan to run an image rendering workload in Azure. The workload uses parallel compute processes.

What is the best service to use to run the workload? More than one answer choice may achieve the goal. Select the BEST answer.

- ☐ an Azure virtual machine scale set
- ☐ Azure Kubernetes Service (AKS)
- ☐ Azure Batch
- ☐ Azure Container Service

Question 75

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You are migrating an on-premises application to Azure. One component of the application is a legacy Windows native executable that performs image processing.

The image processing application must run every hour. During times that the image processing application is not running, it should not be consuming any Azure compute resources.

You need to ensure that the image processing application runs correctly every hour.

Solution: Create an Azure WebJob that runs the image processing application every hour.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

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Question 76

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You need to deploy resources to host a stateless web app in an Azure subscription. The solution must meet the following requirements:

Provide access to the full .NET framework.
Provide redundancy if an Azure region fails.
Grant administrators access to the operating system to install custom application dependencies.

Solution: You deploy a virtual machine scale set that uses autoscaling.

Does this meet the goal?

- ☐ Yes
- ☐ No

Question 77

You have 100 Standard_F2s_v2 Azure virtual machines. Each virtual machine has two network adapters.

You need to increase the network performance of the workloads running on the virtual machines. The solution must meet the following requirements:

The CPU-to-memory ratio must remain the same.
The solution must minimize costs.

What should you do?

- ☐ Configure NIC teaming
- ☐ Enable RDMA over InfiniBand
- ☐ Enable SR-IOV
- ☐ Install an additional network adapter

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Question 78

You are designing a container solution in Azure that will include two containers. One container will host a web API that will be available to the public. The other container will perform health monitoring of the web API and will remain private. The two containers will be deployed together as a group.

You need to recommend a compute service for the containers. The solution must minimize costs and maintenance overhead.

What should you include in the recommendation?

- ☐ Azure Service Fabric
- ☐ Azure Container Service
- ☐ Azure Kubernetes Service (AKS)
- ☐ Azure Container registries

Question 79

You plan to deploy an API by using Azure API Management.

You need to recommend a solution to protect the API from a distributed denial of service (DDoS) attack.

What should you recommend?

- ☐ Create network security groups (NSGs).
- ☐ Enable quotas.
- ☐ Enable rate limiting.
- ☐ Strip the Powered-By responsible header.

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Question 80

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You are designing an Azure solution for a company that wants to move a .NET Core web application from an on-premises data center to Azure. The web application relies on a Microsoft SQL Server 2016 database on Windows Server 2016. The database server will not move to Azure.

A separate networking team is responsible for configuring network permissions.

The company uses Azure ExpressRoute and has an ExpressRoute gateway connected to an Azure virtual network named VNET1.

You need to recommend a solution for deploying the web application.

Solution: Deploy the web application by using an Azure Kubernetes Service (AKS) container on VNET1.

Does this meet the goal?

- ☐ Yes
- ☐ No

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Question 81

You architect a solution that calculates 3D geometry from height-map data.

You have the following requirements:

Perform calculations in Azure.
Each node must communicate data to every other node.
Maximize the number of nodes to calculate multiple scenes as fast as possible.
Require the least amount of effort to implement.

You need to recommend a solution.

Which two actions should you recommend? Each correct answer presents part of the solution.

NOTE: Each correct selection is worth one point.

- ☐ Create a render farm that uses Azure Batch.
- ☐ Enable parallel file systems on Azure.
- ☐ Enable parallel task execution on compute nodes.
- ☐ Create a render farm that uses virtual machine (VM) scale sets.
- ☐ Create a render farm that uses virtual machines (VMs).

Question 82

You are designing an Azure solution.

The network traffic for the solution must be securely distributed by providing the following features:

HTTPS protocol
Round robin routing
SSL offloading

You need to recommend a load balancing option.

What should you recommend?

- ☐ Azure Load Balancer
- ☐ Azure Traffic Manager
- ☐ Azure Internal Load Balancer (ILB)
- ☐ Azure Application Gateway

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Question 83

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A separate networking team is responsible for configuring network permissions.

The company uses Azure ExpressRoute and has an ExpressRoute gateway connected to an Azure virtual network named VNET1.

You need to recommend a solution for deploying the web application.

Solution: Deploy the web application to a web app hosted in an isolated App Service plan on VNET1.

Does this meet the goal?

- ☐ Yes
- ☐ No

Question 84

You need to recommend a solution to generate a monthly report of all the new Azure Resource Manager resource deployments in your subscription.

What should you include in the recommendation?

- ☐ the Change Tracking management solution
- ☐ Azure Activity Log
- ☐ Azure Monitor action groups
- ☐ Azure Advisor

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Question 85

HOTSPOT

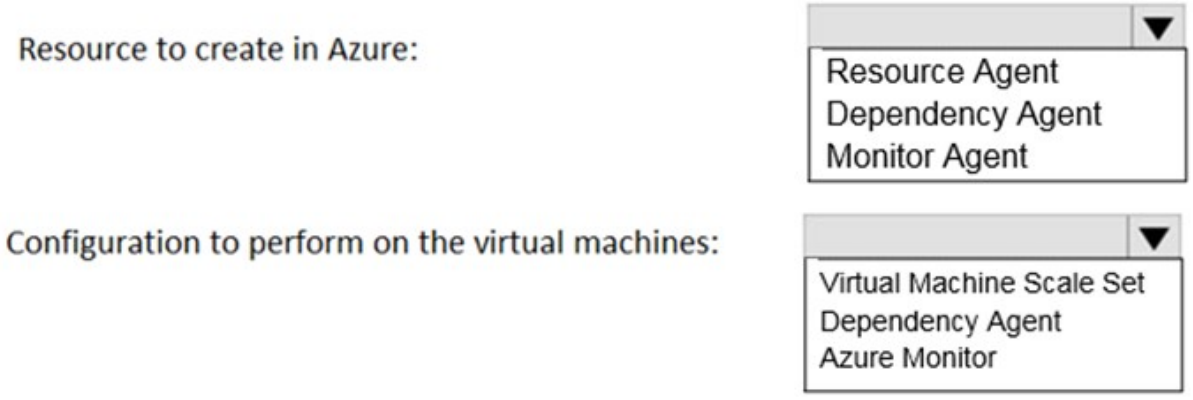
You have an Azure subscription that contains 300 Azure virtual machines that run Windows Server 2016.

You need to centrally monitor all warning events in the System logs of the virtual machines.

What should you include in the solutions? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Answer Area



Question 86

You are developing a web application that provides streaming video to users. You configure the application to use continuous integration and deployment.

The app must be highly available and provide a continuous streaming experience for users.

You need to recommend a solution that allows the application to store data in a geographical location that is closest to the user.

What should you recommend?

- ☐ Azure App Service Web Apps
- ☐ Azure App Service Isolated
- ☐ Azure Redis Cache
- ☐ Azure Content Delivery Network (CDN)

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Question 87

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are migrating an on-premises application to Azure. One component of the application is a legacy Windows native executable that performs image processing.

The image processing application must run every hour. During times that the image processing application is not running, it should not be consuming any Azure compute resources.

You need to ensure that the image processing application runs correctly every hour.

Solution: Create an Azure Function to run the image processing application every hour.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

Question 88

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After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing a storage solution to support on-premises resources and Azure-hosted resources.

You need to provide on-premises storage that has built-in replication to Azure.

Solution: You include Azure StorSimple in the design.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

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Question 89

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing a storage solution to support on-premises resources and Azure-hosted resources.

You need to provide on-premises storage that has built-in replication to Azure.

Solution: You include Azure Data Lake Storage in the design.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

Question 90

Note: This question is part of series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

You are designing a storage solution to support on-premises resources and Azure-hosted resources.

You need to provide on-premises storage that has built-in replication to Azure.

Solution: You include Azure Blob storage in the design.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

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Question 91

Your company has an on-premises Windows HPC cluster. The cluster runs an intrinsically parallel, compute-intensive workload that performs financial risk modelling.

You plan to migrate the workload to Azure Batch.

You need to design a solution that will support the workload. The solution must meet the following requirements:

Support the large-scale parallel execution of Azure Batch jobs.
Minimize cost.

What should you include in the solution?

- ☐ Basic A-series virtual machines
- ☐ low-priority virtual machines
- ☐ burstable virtual machines
- ☐ Azure virtual machine sizes that support the Message Passing Interface (MPI) API

Question 92

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The image processing application must run every hour. During times that the image processing application is not running, it should not be consuming any Azure compute resources.

You need to ensure that the image processing application runs correctly every hour.

Solution: Create an Azure Batch application that runs the image processing application every hour.

Does the solution meet the goal?

- ☐ Yes
- ☐ No

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Question 93

A partner manages on-premises and Azure environments. The partner deploys an on-premises solution that needs to use Azure services. The partner deploys a virtual appliance.

All network traffic that is directed to a specific subnet must flow through the virtual appliance.

You need to recommend solutions to manage network traffic.

Which two options should you recommend? Each correct answer presents a complete solution.

NOTE: Each correct selection is worth one point.

- ☐ Configure Azure Traffic Manager
- ☐ Implement an Azure virtual network
- ☐ Configure a routing table with forced tunneling
- ☐ Implement Azure ExpressRoute

Question 94

You deploy two instances of an Azure web app. One instance is in the East US Azure region and the other instance is in the West US Azure region. The web app uses Azure Blob storage to deliver large files to end users.

You need to recommend a solution for delivering the files to the users. The solution must meet the following requirements:

Ensure that the users receive files from the same region as the web app that they access.
Ensure that the files only need to be updated once.
Minimize costs.

What should you include in the recommendation?

- ☐ Azure File Sync
- ☐ Distributed File System (DFS)
- ☐ read-access geo-redundant storage (RA-GRS)
- ☐ geo-redundant storage (GRS)

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Question 95

DRAG DROP

An organization has an on-premises server that runs Windows Server 2003. The server hosts an IIS-based stateless web application that uses forms authentication. The application consists of classic Active Server Pages (ASP) pages and third-party components (DLLs) that are registered in the Windows registry.

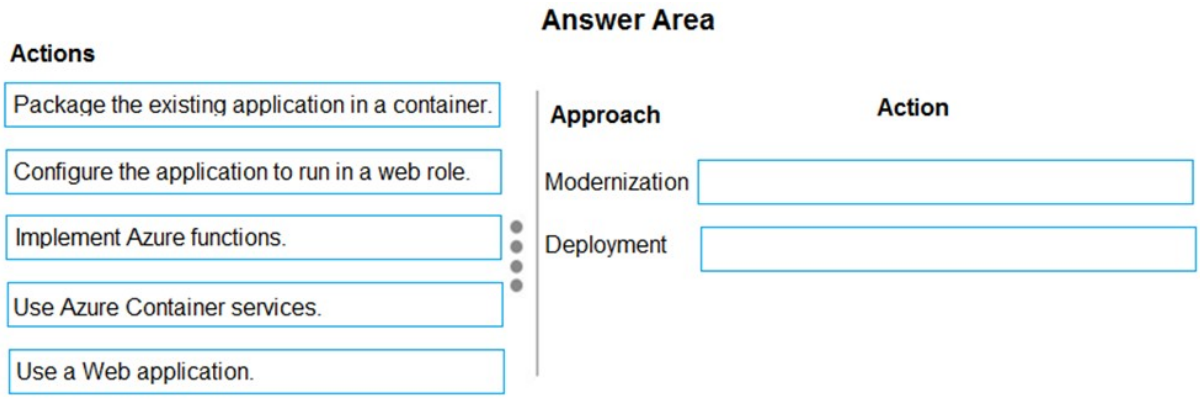
The deployment process for the web application is manual and is prone to errors. The deployment process makes it difficult to roll out updates, scale out, and recover after failures.

You need to design a modernization approach for the web application that meets the following requirements:

Improve the deployment process.
Ensure that the application can run in the cloud.
Minimize changes to application code.
Minimize administrative effort required to implement the modernization solution.

What should you recommend? To answer, drag the appropriate actions to the correct approaches. Each action may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

NOTE: Each correct selection is worth point.



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